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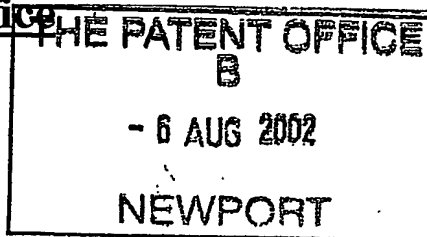
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1. Your reference	11044P6 GB/AB		
2. Patent application number (The Patent Office will fill in this part)	0218194.9		
3. Full name, address and postcode of the or of each applicant (underline all surnames)	Reckitt Benckiser N.V. Kantoorgebouw De Appelaer De Fruittuinen 2-12 2132 NZ Hoofddorp NETHERLANDS		
Patents ADP number (if you know it)  If the applicant is a corporate body, give the country/state of its incorporation	07921075005  Netherlands		
4 Title of the invention	Solid Formulations		
5. Name of your agent (if you have one)  "Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	Andrew S Brown Reckitt Benckiser plc Group Patents Department Dansom Lane HULL HU8 7DS UNITED KINGDOM		
Patents ADP number (if you know it)	07799521001		
5. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of filing (day / month / year)
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application (day / month / year)		Date of filing (day / month / year)
1. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if: a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body. See note (d))	Yes		

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)  
  
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11.

I/We request the grant of a patent on the basis of this application.

Signature

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Andrew S Brown

5 August 2002

12. Name and daytime telephone number of Person to contact in the United Kingdom

Andrew S Brown (01482) 582411

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DUPLICATE

5

SOLID FORMULATIONS

The invention relates to a method of cleaning carpet, the method comprising the addition to the reservoir of a carpet cleaning machine a water-soluble solid product comprising a carpet cleaning composition, adding water to the reservoir of the carpet cleaning machine prior to or after adding the solid product, and operating the carpet cleaning machine on a soiled carpet.

15 The present invention relates to water-soluble solid products for carpet cleaning machines, preferably in the form of a powder, granule, pellet or tablet, and methods of making such a solid product and methods of using such a product. Preferred solid products are tablets that have  
20 been specifically designed for carpet cleaning and especially for carpet cleaning extraction machines. The solid products of the invention need to be soluble in water and to dissolve in a short time period, typically less than 5 minutes, without any stirring, to produce a  
25 product having low or no solid residue. A common feature of many carpet cleaning machines is the inclusion of a fine mesh which acts as a filter preventing solid material from entering and damaging the pumping mechanisms. Therefore, it is important that there are no  
30 low solid residues in the reservoir so as to avoid any blockages.

We present as a feature of the invention a method of cleaning a soiled carpet the method comprising adding to  
35 the reservoir of a carpet cleaning machine a water-soluble solid product comprising a carpet cleaning

---

5 composition, adding water to the reservoir of the carpet cleaning machine prior to or after adding the solid product, and operating the carpet cleaning machine on the soiled carpet.

10 Preferably the solid product is added to the reservoir of the carpet cleaning machine prior to adding the water.

The solid product may be a powder, granule, pellet or a tablet. Preferably the solid product is a tablet.

15

Preferably a combination of effervescent technology, which uses a carbonate/bicarbonate with an acid, and optionally a swelling disintegrant is used to obtain rapid dissolution. The pre-dosed solid product is put  
20 into the carpet cleaner machine tank with water. The product dissolves quickly so that it is possible to start cleaning in a short period of time without danger of blocking the machine.

25 The product provides the consumer with a convenient solid form, which is pre-dosed when in tablet form, avoiding the need to dilute the product before it is added to the machine, which may be necessary with liquid concentrate formulations.

30

A problem associated with cleaning carpets is the high repellancy of the carpet to water. This is primarily caused from two sources, the first being the amount of soiling which can accumulate on carpets and, secondly,  
35 the prevalence of stain repelling treatments which are increasingly commonly applied to carpets either during

5 manufacture or by the consumer. In this invention a  
super wetting agent is a special surfactant added at  
levels of below 10%w/w of the composition, preferably  
below 5% w/w, of the composition, and can lower the  
surface tension of the final liquid cleaning formulation  
10 to values below 28 mN/m, when 1 to 25g, ideally 2 to 12g,  
preferably 3 to 10g, of solid composition is dissolved in  
4 litres of water.

We present as a further feature of the invention a water-  
15 soluble carpet cleaning composition in solid form  
comprising at least one surfactant and at least one super  
wetting agent wherein the combined surface tension effect  
of the surfactant and the super wetting agent in the  
composition that is capable of reducing the surface  
20 tension of water below 28 mN/m when 1 to 25g, ideally 2  
to 12g, preferably 3 to 10g, of the composition is  
dissolved in 4 litres of water.

We have developed a product that contains a composition  
25 particularly suitable for carpet cleaning extraction  
machines. These compositions comprise at least one  
surfactant and at least one super wetting agent.  
Preferably these compositions additionally comprise a  
builder, an antifoaming agent and at least one of the  
30 following optional ingredients such as, solvent,  
fragrance, preservative, dye, bactericide and filler.  
Optional ingredients are present in an amount of up to  
2%w/w.

35 Other ingredients which may form part of this invention  
are disintegrants to provide good solubility and quick

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5 dissolution in water without the need for any stirring or  
agitation, flowing agents to improve the flowability of  
the solids during manufacturing, anti-cake and anti-stick  
agents to reduce the stickiness of the solids to the  
mould during powder tabletting, binding agents to provide  
10 products with good cohesion and adsorbing products which  
entrap any fragrance that is present.

Preferably from 1 to 25g of product is used per machine,  
ideally from 2 to 12g, and preferably from 3 to 10g.

15

#### Surfactant

Preferred levels of surfactant are from 1 to 40% w/w,  
ideally 10 to 20% wt and preferably 15 to 19% w/w. Non  
ionic and anionic surfactants can be used.

20

The non-ionic surfactant is preferably a surfactant  
having a formula  $RO(CH_2CH_2O)_nH$  wherein R is a mixture of  
linear, even carbon-number hydrocarbon chains ranging  
from  $C_{12}H_{25}$  to  $C_{16}H_{33}$  and n represents the number of  
25 repeating units and is a number of from about 1 to about  
12. Examples of other non-ionic surfactants include  
higher aliphatic primary alcohols containing about twelve  
to about 16 carbon atoms which are condensed with about  
three to thirteen moles of ethylene oxide.

30

Other examples of non-ionic surfactants include primary  
alcohol ethoxylates (available under the Neodol tradename  
from Shell Co.), such as  $C_{11}$  alkanol condensed with 9  
moles of ethylene oxide (Neodol 1-9),  $C_{12-13}$  alkanol  
35 condensed with 6.5 moles ethylene oxide (Neodol 23-6.5),  
 $C_{12-13}$  alkanol with 9 moles of ethylene oxide (Neodol 23-

5 9), C12-15 alkanol condensed with 7 or 3 moles ethylene  
oxide (Neodol 25-7 or Neodol 25-3), C14-15 alkanol  
condensed with 13 moles ethylene oxide (Neodol 45-13),  
C9-11 linear ethoxylated alcohol, averaging 2.5 moles of  
ethylene oxide per mole of alcohol (Neodol 91-2.5), and  
10 the like.

Other examples of non-ionic surfactants suitable for use  
in the present invention include ethylene oxide  
condensate products of secondary aliphatic alcohols  
15 containing 11 to 18 carbon atoms in a straight or  
branched chain configuration condensed with 5 to 30 moles  
of ethylene oxide. Examples of commercially available  
non-ionic detergents of the foregoing type are C11-15  
secondary alkanol condensed with either 9 moles of  
20 ethylene oxide (Tergitol 15-S-9) or 12 moles of ethylene  
oxide (Tergitol 15-S-12) marketed by Union Carbide, a  
subsidiary of Dow Chemical.

Octylphenoxy polyethoxyethanol type non-ionic  
25 surfactants, for example, Triton X-100, as well as amine  
oxides can also be used as a non-ionic surfactant in the  
present invention.

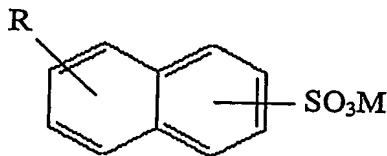
Other examples of linear primary alcohol ethoxylates are  
30 available under the Tomadol tradename such as, for  
example, Tomadol 1-7, a C11 linear primary alcohol  
ethoxylate with 7 moles EO; Tomadol 25-7, a C12-C15  
linear primary alcohol ethoxylate with 7 moles EO;  
Tomadol 45-7, a C14-C15 linear primary alcohol ethoxylate  
35 with 7 moles EO; and Tomadol 91-6, a C9-C11 linear  
alcohol ethoxylate with 6 moles EO.

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5 A preferred surfactant is an anionic surfactant. Such anionic surface-active agents are frequently provided in a salt form, such as alkali metal salts, ammonium salts, amine salts, aminoalcohol salts or  
10 magnesium salts. Contemplated as useful are one or more sulfate or sulfonate compounds including: alkyl sulfates, alkyl ether sulfates, alkylamidoether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamide sulfonates,  
15 alkylarylsulfonates, olefinsulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfosuccinamate, alkyl sulfoacetates, alkyl phosphates, alkyl ether phosphates, acyl sarconsinates, acyl  
20 isethionates, and N-acyl taurates. Generally, the alkyl or acyl radical in these various compounds comprise a carbon chain containing 12 to 20 carbon atoms.

Particularly preferred are alkyl naphthalene sulfonate  
25 anionic surfactants of the formula:



30 wherein R is a straight chain or branched alkyl chain having from about 1 to about 25 carbon atoms, saturated or unsaturated, and the longest linear portion of the alkyl chain is 15 carbon atoms or less on the average, M  
35 is a cation which makes the compound water soluble

5 especially an alkali metal such as sodium or magnesium,  
ammonium or substituted ammonium cation.

Most desirably, the anionic surfactant according to  
constituent is selected to be of a type that dries to a  
10 friable powder. This facilitates their removal from  
carpets and carpet fibres, such as by brushing or  
vacuuming.

### Super Wetting Agent

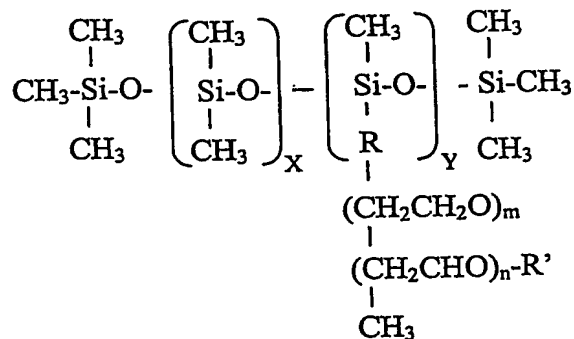
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A super wetting agent is capable of reducing the surface  
tension in water at values below 25 mN/m, in the range  
between 18 and 25 mN/m at concentrations of 0.0001-1%w/v,  
preferably between 0.001 and 0.1%w/v.

20

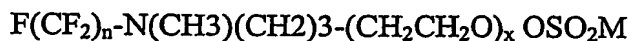
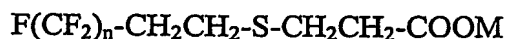
Preferred levels in the solid composition are between  
0.01 and 10%w/w. Examples of super wetting agents of this  
invention are silicone glycol copolymers and  
fluorosurfactants. The silicone glycol copolymers are  
25 described by the following formula:

30



35 Where x, y, m and n are whole number ranging from 0 to  
25. X is preferred between 0-10 and y, m and n between 0-

- 5 5. R and R' are straight chain or branched alkyl chain having from about 1 to about 25 carbon atoms, saturated or unsaturated, and the longest linear portion of the alkyl chain is 15 carbon atoms or less on the average. The fluorinated surfactant is described in the following  
10 formulae:



Wherein n, m and x are integers having a value from 0 to 15; preferred values are between 1 and 12. M is a cation which makes the compound water soluble especially an  
20 alkali metal such as sodium or magnesium, ammonium or substituted ammonium cation.

#### Antifoaming

Antifoaming agents are an important addition to carpet  
25 cleaning compositions of this invention, they are used at a level between 0.01 and 5%w/w. A very high foam level may not allow the carpet cleaning machine to function properly and tends to reduce the mechanical action of the carpet cleaner machine brushes, thus having a detrimental  
30 impact on soil removal. Antifoaming agents are also considered important components of this invention. Examples are polydimethylsiloxanes, preferably in combination with hydrophobic silica.

#### 35 Builders

- 5 The carpet cleaning composition comprises at least one builder active or better a combination of builders from 1 to 90 % w/w, preferably from 65 to 85 % w/w.

Suitable polymer water-soluble compounds include the  
10 water soluble monomeric polycarboxylates, or their acid forms, homo or copolymeric polycarboxylic acids or their salts in which the polycarboxylic acid comprises at least two caroxylic radicals separated from each other by not more than two carbon atoms, carbonates, bicarbonates,  
15 borates, phosphates, and mixtures of any of thereof.

The carboxylate or polycarboxylate builder can be monomeric or oligomeric in type although monomeric polycarboxylates are generally preferred for reasons of  
20 cost and performance.

Suitable carboxylates containing one carboxy group include the water soluble salts of lactic acid, glycolic acid and ether derivatives thereof. Polycarboxylates  
25 containing two carboxy groups include the water-soluble salts of succinic acid, malonic acid, (ethylenedioxy) diacetic acid, maleic acid, diglycolic acid, tartaric acid, tartronic acid and fumaric acid, as well as the ether carboxylates and the sulfinyl carboxylates.

30 Polycarboxylates containing three carboxy groups include, in particular, water-soluble citrates, aconitrates and citraconates as well as succinate derivates such as the carboxymethloxysuccinates described in GB-A-1,379,241, lactoxysuccinates described in GB-A-1,389,732, and  
35 aminosuccinates described in NL-A-7205873, and the

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- 5 oxypolycarboxylate materials such as 2-oxa-1,1,3-propane tricarboxylates described in GB-A-1,387,447.

Polycarboxylate containing four carboxy groups include oxydisuccinates disclosed in GB-A-1,261,829, 1,1,2,2-  
10 ethane tetracarboxylates, 1,1,3,3-propane tetracarboxylates and 1,1,2,3-propane tetracarboxylates. Polycarboxylates containing sulfo substituents include the sulfosuccinate derivatives disclosed in GB-A-  
1,398,421, GB-A-1,398,422 and US-A-3,936,448, and the  
15 sulfonated pyrrolidone citrates described in GB-A-1,439,000.

Alicyclic and heterocyclic polycarboxylates include cyclopentane-cis,cis,cis-tetracarboxylates, cyclopentadienide pentacarboxylates, 2,3,4,5,6-hexane -  
20 hexacarboxylates and carboxymethyl derivatives of polyhydric alcohols such as sorbitol, mannitol and xylitol. Aromatic polycarboxylates include mellitic acid, pyromellitic acid and the phthalic acid derivatives disclosed in GB-A-1,425,343.

25

Of the above, the preferred polycarboxylates are hydroxycarboxylates containing up to three carboxy groups per molecule, more particularly citrates.

- 30 More preferred polymers are homo-polymers, copolymers and multiple polymers of acrylic, fluorinated acrylic, sulfonated styrene, maleic anhydride, metacrylic, isobutylene, styrene and ester monomers.

Examples of these polymers are Acusol supplied from Rohm  
35 & Haas, Syntran supplied from Interpolymer and Versa and

5 Alcosperse series supplied from Alco Chemical, a National Starch & Chemical Company.

- The parent acids of the monomeric or oligomeric polycarboxylate chelating agents or mixtures therefore  
10 with their salts, e.g. citric acid or citrate/citric acid mixtures are also contemplated as useful builder components.

- Borate builders, as well as builders containing borate-forming materials than can produce borate under detergent  
15 storage or wash conditions can also be.

- Iminosuccinic acid metal salts.

- Polyaspartic acid metal salts.

- Examples of bicarbonate and carbonate builders are the alkaline earth and the alkali metal carbonates, including  
20 sodium carbonate and sesqui-carbonate and mixtures thereof. Other examples of carbonate type builders are the metal carboxy glycine and metal glycine carbonate.

- Ethylene diamino tetra acetic acid and salt forms.

- Water-soluble phosphonate and phosphate builders are  
25 useful for this invention. Examples of phosphate builders are the alkali metal tripolyphosphates, sodium potassium and ammonium pyrophosphate, sodium and potassium and ammonium pyrophosphate, sodium and potassium orthophosphate sodium polymeta/phosphate in which the  
30 degree of polymerisation ranges from 6 to 21, and salts of phytic acid.

Specific examples of water-soluble phosphate builders are the alkali metal tripolyphosphates, sodium potassium and  
35 ammonium pyrophosphate, sodium and potassium and ammonium pyrophosphate, sodium and potassium orthophosphate,

- 5 sodium polymeta/phosphate in which the degree of  
polymerization ranges from 6 to 21, and salts of phytic  
acid.

Additional ingredients important for the tableting of  
10 the composition, are selected from the commonly found in  
detergent tablet compositions, such as described in WO  
0233038, and include.

#### Disintegrants

- 15 -Suitable cross-linked polymeric disintegrants for use  
herein include cross-linked starches, cross-linked  
cellulose ethers, cross-linked polyvinylpyrrolidones,  
cross-linked carboxy-substituted ethylenically-  
unsaturated monomers, cross-linked polystyrene  
20 sulphonates and mixtures thereof. High preferred are the  
cross-linked polyvinylpyrrolidones. Suitable cross-  
linking agents include bi- and multi-functional linking  
moieties selected from divinyl and diallyl cross-linkers,  
polyols, polyvinylalcholols, polyalkylenepolymines,  
25 ethyleneimine containing polymers, vinylamine containing  
polymers and mixturesx thereof. Alternatively, the  
vinylpyrrolidone can be cross-linked in-situ by so-called  
proliferous polymerisation.

30 Suitable additional disintegrants include:

- a) non-cross and cross linked polymeric disintegrants;
- b) water-soluble hydrated salts having a solubility in  
distilled water of at least about 25g/100g at 25°C;
- c) effervescent agents; and
- 35 d) mixtures thereof.

- 5 Levels of disintegrant are from 0.1%w/w to 20%w/w, preferably up to 10%w/w.

Preferred water-soluble hydrates salts are selected from hydrates of sodium acetate, sodium metaborate, sodium  
10 orthophosphate, sodium dihydrogenphosphate, disodium hydrogen phosphate, sodium potassium tartrate potassium aluminium sulphate, calcium bromide, calcium nitrate, sodium citrate, potassium citrate and mixtures thereof. Particularly suitable materials include sodium acetate  
15 trihydrate, sodium metaborate tetrahydrate or octahydrate, sodium orthophosphate dodecahydrate, sodium dihydrogen phosphate dihydrate, the di-, hepta- or dodecahydrate of disodium hydrogen phosphate, sodium potassium tartrate tetrahydrate, potassium aluminium sulphate  
20 dodecahydrate, calcium bromide hexahydrate, tripotassium citrate monohydrate, calcium nitrate tetrahydrate and sodium citrate dihydrate. In preferred embodiments, the water-soluble hydrated salt is selected from water-soluble mono-, di- tri- and tetrahydrate salts and  
25 mixtures thereof. Highly preferred herein is sodium acetate trihydrate, tripotassium citrate monohydrate, mixed alkali-metal citrates containing at least one potassium ion and mixtures thereof. Highly preferred are sodium acetate trihydrate and tripotassium citrate  
30 monohydrate.

Where an effervescence system is present it comprises as its components, an acid and a carbonate source, capable of formation of carbon dioxide upon contact with water.



- 5 The acid source component may be any organic, mineral or inorganic acid, or a derivative thereof, or a mixture thereof. Preferably the acid source component comprises an acid or partially salified polymer.
- 10 The acid compound is preferably substantially anhydrous or low-hygroscopic and the acid is preferably water-soluble. It may be preferred that the acid source is overdried.
- 15 Suitable acids source components include acidic polymers already described previously as builders, citric, maleic, malic, fumaric, aspartic, glutaric, tartaric succinic or adipic acid, monosodium phosphate, boric acid, or derivative thereof acidic polymers are especially
- 20 preferred.

As discussed above, the effervescence system preferably comprises an alkali source, however, for the purpose of the invention, it should be understood that the alkali

25 source may be part of the effervescence particle or can be part of the cleaning composition comprising the particle, or can be present in the washing liquor, whereto the particle or the cleaning composition is added.

30

Any alkali source which has the capacity to react with the acid source to produce a gas may be present in the particle, which may be any gas known in the art, including nitrogen oxygen and carbon dioxide gas.

35 Preferred can be perhydrate bleaches, including perborate, and silicate material. The alkali source is

5 preferably substantially anhydrous or non-hygroscopic. It may be preferred that the alkali source is overdried. Preferably this gas is carbon dioxide, and therefore the alkali source is preferably a source of carbonate, which can be any source of carbonate known in the art. In  
10 a preferred embodiment, the carbonate source is a carbonate and bicarbonate salts. Examples of preferred carbonates are the alkaline earth and alkali metal bicarbonates and carbonates, including sodium or potassium carbonate, bicarbonate and sesqui-carbonate and  
15 any mixtures thereof with ultra-fine calcium carbonate such as are disclosed in German Patent Application No. 2,321,001 published on Nov. 15, 1973. Alkali metal percarbonate salts are also suitable sources of carbonate species, which may be present combined with one or more  
20 other carbonate sources.

The carbonate and bicarbonate preferably have an amorphous structure. The carbonate and/or bicarbonates may be coated with coating materials.

25 The molecular ratio of the acid source to the alkali source present in the particle core is preferably from 50:1 to 1:50, more preferably from 20:1 to 1:20 more preferably from 10:1 to 1:10, more preferably from 5:1 to 1:3, more preferably from 3:1 to 1:2, more preferably  
30 from 2:1 to 1:2.

#### Flow agents

Examples are silica powder, talc and metal stearates. They improve the flowability of the powder during  
35 manufacturing and they reduce the stickiness of the powder to the mould during powder tabletting

5

Binding agents

Examples of binders are polyethylene and polypropylene glycol with an average molecular weight ranging from 100 to 10000 and non cross-linked starches, cellulose ethers, polyvinylpyrrolidones, carboxy-substituted ethylenically-unsaturated monomers, polystyrene sulphonates and mixtures thereof. High preferred are the polyvinylpyrrolidones.

15 Solvents

The solvent constituent of the inventive compositions include one or more alcohols, glycols, acetates, ether acetates and glycol ethers. Exemplary alcohols useful in the compositions of the invention include C2-C8 primary and secondary alcohols which may be straight chained or branched. Exemplary alcohols include pentanol and hexanol. Exemplary glycol ethers include those glycol ethers having the general structure Ra-O-Rb-OH, wherein Ra is an alkoxy of 1 to 20 carbon atoms, or aryloxy of at least 6 carbon atoms, and Rb is an ether condensate of propylene glycol and/or ethylene glycol having from 1 to 10 glycol monomer units. Preferred are glycol ethers having 1 to 5 glycol monomer units. By way of further non-limiting example specific organic constituents include propylene glycol methyl ether, dipropylene glycol methyl ether, tripropylene glycol methyl ether, propylene glycol n-propyl ether, ethylene glycol n-butyl ether, diethylene glycol n-butyl ether, diethylene glycol methyl ether, propylene glycol, ethylene glycol, isopropanol, ethanol, methanol, diethylene glycol monoethyl ether

- 5 acetate and particularly useful is , propylene glycol phenyl ether.

Process manufacturing:

- 10 The powder raw materials can be mixed directly or liquid spraying process can be required for certain raw materials such as fragrances, super wetting agents and antifoaming agents.
- 15 A wet granulation process could be required so that the fine powder ingredients are granulated with a water based formulation containing several ingredients as for example antifoaming agent, superwetting agent, dyes and fragrance. After the granulation the wet powder is dried,
- 20 then sieved and mixed with other coarse powders.

The tablets may be manufactured by using any compacting process, such as tabletting, briquetting, or extrusion, preferably tabletting. Suitable equipment includes a

25 standard single stroke or a rotary press (such as Courtoy.RTM., Korsch.RTM., Manesty.RTM., or Bonals.RTM.). The tablets prepared according to this invention preferably have a weight between 1 to 25g, ideally from 2 to 12g, preferably from 3 to 10g.

30

Examples of shapes are cylindrical, sphere and cubic.

The compaction pressure used for preparing these tablets is in the range 1000-20000 kN/m<sup>2</sup>, preferably between 1500

35 and 10000 kN/m<sup>2</sup>.

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5 Evaluation Test

The tablets have been evaluated in terms of surface tension when dissolved in deionised water, dissolution time in warm water ( $T=40^{\circ}\text{C}$ ), remaining residue after  
10 dissolution and soil removal performance versus Resolve™ for steam machine taken as a reference of the machine carpet cleaner products.

SURFACE TENSION MEASUREMENTS:

15

The surface tension has been measured with a tensiometer, by the ring method. A platinum ring is immersed in 12 French degree water solution maintained at  $20^{\circ}\text{C}$ , where previously has been dissolved a tablet. The  
20 ring is taken out slowly from the liquid. When the ring is near the air/liquid interface, it is balance by the tensiometer the force for the ring extraction. The maximum force versus area gained before breaking the liquid film formed is the surface tension of the liquid  
25 formula.

The lower the surface tension expressed in  $\text{mN/m}$ , the better the formula performance in terms of wettability on carpet surface.

A surface tension target value for the composition is  
30 below  $28 \text{ mN/m}$ .

DISSOLUTION AND RESIDUE EVALUATION TEST:

One tablet of 15 grams is put in a beaker containing one  
35 gallon of warm water ( $T=40^{\circ}\text{C}$ ). The effervescent effect,

5 the dissolution time as well as the remaining residue quantity are considered and recorded.

A recording data table with all parameter ratings is reported below:

Dissolution rating	Effervescent effect	Dissolution time	Residue
0	No effect	More than 30 minutes	More than 20% wt
1	No effect	More than 10 minutes	More than 20% wt
2	Low	More than 10 minutes	More than 10% wt
3	Medium	Between 5 and 10 minutes	More than 10% wt
4	Medium	Between 5 and 10 minutes	Between 5 and 10 % wt
5	Strong	Between 5 and 10 minutes	Between 5 and 10 % wt
6	Strong	Less than 5 minutes	Between 5 and 10 % wt
7	Strong	Less than 5 minutes	Less than 5 % wt

10

The higher the rating number, the better the dissolution.

#### SOIL REMOVAL TEST:

15 This method has been designed for the evaluation of soil removal performance of extraction cleaner formulations.

The soil has the following composition:

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5	- Soil components:	% by weight
	- Peat Moss	47.7
	- Cement	21.4
	- Kaolin clay	8.0
10	- Silica	8.0
	- Red Iron oxide	1.3
	- Charcoal	12.6
	- Mineral oil	1.0

15 A nylon carpet is used for the test.

The carpet is soiled with 5 grams of standard soil. The soil is applied 1 gram once by strainer. The soiled carpet is then put with 4 kg of steel beads in the jar mill and stirred for 30 minutes at 56 rpm.

20 They are dissolved in warm tap water ( $T = 40^{\circ}\text{C}$ ), one 15 grams per one gallon of water. The Resolve for steam machine is diluted according to its labelling instructions.

Carpet is cleaned with appropriate machine/product using  
25 4 wet strokes (dispensing solution) and 2 dry strokes (vacuuming up solution).

Carpet swatches are placed in a dark room temperature chamber ( $25^{\circ}\text{C} / 50\%\text{RH}$ ) for 24 hours while they dry.

30 The cleaning performance is evaluated by measuring the carpet with a portable spectrophotometer before soiling, after soiling and after the cleaning process. The result is reported as soil removal percentage.

35 EXAMPLES:

- 5 The fined powder are typically granulated with a water formulation, then dried and mixed with the remaining coarse powder ingredients. Examples of compositions forming a part of the present invention are set below in Table 1 with the various components identified in Table
- 10 2.

Components	Table 1					
	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6
	%	%	%	%	%	%
Baypure CX100	7.28					
Baypure DS100	0.82					
Citric acid anhydrous DC F20	14.00	14.00			7.00	
Bicar-TEC 27/50 G	15.00	15.00	15.00	15.00	13.00	15.00
Tri-sodium citrate dehydrate F6000	9.20	18.30	8.80	8.80		7.82
Sodium carbonate anhydrous	26.00	26.00	26.00	24.80	33.30	25.32
PEG 6000	4.00	4.00	4.00	4.00	4.00	2.50
Petro 11 powder	16.50	16.50	16.50	16.50	16.50	16.85
Syntran DX 102-2-3	1.00					
Acusol WE			23.50	24.70	20.00	24.70
Disintex 75	1.00	1.00	1.00	1.00	1.00	1.00
DC Q2-5211	4.00	4.00	4.00	4.00	4.00	4.09



Dye						0.02
Fragrance						0.50
Sipernat 22 S						1.00
BF 20 PLUS	1.20	1.20	1.20	1.20	1.20	1.20

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Table 2	
Component	Description of component
Baypure CX100	Imminodisuccinic acid sodium salt from Bayer
Baypure DS100	Polyaspartic acid sodium salt from Bayer
Citric acid anhydrous DC F20	Starch coated citric acid from Jungbunzlauer
Bicar-TEC 27/50 G	Sodium bicarbonate from Solvay
Tri-sodium citrate dehydrate F6000	Tri-sodium citrate dehydrate from Jungbunzlauer
Sodium carbonate anhydrous	Sodium carbonate anhydrous light from Solvay
PEG 6000	Polyethylene glycol 6000 from Medivete Padana
Petro 11 powder	Sodium alkyl naphthalene sulfonate from Witco
Syntran DX 102-2-3	Acrylic polymer from Interpolymer
Acusol WE	Acrylic polymer from Rohm&Haas
Sipernat 22 S	Silica powder from Degussa
Fragrance	Proprietary fragrance from various suppliers
Dye	Proprietary dye from various suppliers
Disintex 75	Cross-linked polyvinyl polypyrrolidinone from ISP

DC Q2-5211	Methyl (propylhydroxide, ethoxylated) bis (trimethylsiloxy) silane from Dow Corning
BF 20 PLUS	Silicone emulsion from Dow Corning

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EXAMPLE RESULTS:

The tablet example products have been compared with  
 10 Resolve™ for steam machine carpet cleaner in terms of  
 soil removal performance. Oxi Clean™ multi specialist  
 powder from Orange Glo Int. and Bissell™ booster powder  
 from Bissell have been used for comparing the dissolution  
 performance.

15

Results for table 1 formulations:

Product	Surface tension (mN/m)	Dissolution rating	Soil Removal percentage
Ref 1 (Resolve steam	29	-	24.0
Ref 2 (Oxi clean	-	0/1	-
Ref 3 (Bissell	-	1	-
Ex 1	-	7	26.2
Ex 2	27.8	6	24.0
Ex 3	-	6	26.5
Ex 4	24.5	7	26.8

24 -

Ex 5	25.6	7	25.1
Ex 6	24.0	7	28.9

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## CLAIMS

- 10 1. A method of cleaning a soiled carpet the method comprising adding to the reservoir of a carpet cleaning machine a water soluble solid product comprising a carpet cleaning composition, adding water to the reservoir of the carpet cleaning machine prior to or after adding the water soluble  
15 solid product, and operating the carpet cleaning machine on the soiled carpet.
  - 20 2. A method as claimed in claim 1 wherein the water soluble solid product is added to the reservoir of the carpet cleaning machine prior to adding the water.
  - 25 3. A method as claimed in claim 2 or claim 3 wherein the water soluble solid product is a powder, granule, pellet or a tablet.
  - 30 4. A method as claimed in claim 3 wherein the solid is a tablet.
  - 35 5. A method as claimed in any claim from 1 to 4 wherein the carpet cleaning composition comprises at least one surfactant and at least one super wetting agent and wherein the combined effect of the surfactant and the super wetting agent in the composition is capable of reducing the surface tension of water below 28 mN/m when 1 to 30 g of the composition is
-

5 dissolved in 4 litres of water.

6. A water-soluble carpet cleaning composition in solid  
form comprising at least one surfactant and at least  
one wetting agent wherein the combined surface  
10 tension effect of the surfactant and the super  
wetting agent in the composition is capable of  
reducing the surface tension of water below 28 mN/m  
when 1 to 25 g of the solid product is dissolved in  
4 litres of water

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7. A water-soluble carpet cleaning composition in solid  
form as claimed in claim 6 which additionally  
comprises a builder, a disintegrant, an antifoaming  
agent, a solvent and a fragrance.

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8. A water-soluble carpet cleaning composition in solid  
form as claimed in either claim 6 or 7 which is in a  
tablet form.

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AbstractSOLID FORMULATIONS

10 The invention relates to a method of cleaning carpet, the  
method comprising the addition to the reservoir of a  
carpet cleaning machine a water-soluble solid product  
comprising a carpet cleaning composition, adding water to  
the reservoir of the carpet cleaning machine prior to or  
after adding the solid product, and operating the carpet  
15 cleaning machine on a soiled carpet.

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